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GSA Annual Meeting in Phoenix, Arizona, USA - 2019

Paper No. 38-23

Presentation Time: 9:00 AM-5:30 PM

TAPHONOMIC COMPARISON OF VERTEBRATE MICROFOSSIL BONEBEDS FROM THE UPPER CRETACEOUS JUDITH RIVER AND HELL CREEK FORMATIONS OF MONTANA

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Vertebrate microfossil bonebeds (VMBs), concentrations of small, disarticulated, and taxonomically diverse vertebrate hard parts (teeth, scales, small bones and bone fragments), are notably abundant in the Car Judith River (JRF) and Maastrichtian Hell Creek (HCF) formations of Montana. VMBs in both units have been sampled to specifically recover information on small-bodied taxa (e.g., mammals, lizards, amphibians) to estimate relative abundance and species richness in Cretaceous ecosystems up to the K-Pg boundary. Recent taphonomic studies of JRF VMBs indicate that they occur in two general facies contexts: mudstones that represent low-energy lacustrine settings and sandstones that represent active channel settings. Sieved bulk samples of JRF VMBs yield large samples of tiny vertebrate fossils that exhibit consistent patterns of preservation among sites, regardless of facies context. Most JRF VMB fossils recovered from sieves are fragments in the 1–2 mm size range (1.6 mm on average), with ~18% of recovered specimens identifiable to taxon. Teeth and scales dominate the identifiable fraction (fish remains are most abundant). Size sorting is comparable regardless of facies context, and compact and plate-shaped bioclasts are most abundant. VMBs in the H comparable facies and exhibit similar taphonomic attributes on outcrop, suggesting that Hell Creek and Judith River VMBs accumulated via similar processes. To test this hypothesis, a team of Keck Geology Gate students used methods previously developed for the JRF to study bulk samples from two HCF sites (one from each facies context). As in the JRF, both HCF sites are dominated by mm-scale bioclasts (1.6 mm on average) both are dominated by compact and plate-shaped bioclasts, with fish once again most common in the identifiable fraction, which ranges from ~9% (fluvial site) to ~35% (lacustrine site). Importantly, there are no significant distinctions in bioclast size and shape between JRF and HCF sites, and this suggests that VMBs from the JRF and HCF potentially share similar formative histories and can be compared without concern of major taphonomic bias. In this preliminary study, only sieved samples were compared: future comparisons will sample more Hell Creek sites and include study of surface collections.

Session No. 38--Booth# 223

D22. Paleontology: Paleogeology/Taphonomy (Posters)

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[Back to: D22. Paleontology: Paleogeology/Taphonomy \(Posters\)](#)

[<< Previous Abstract](#) | [Next Abstract >>](#)